



HOKKAIDO UNIVERSITY

Title	1. The "Ushio Maru" Cruise 215, 216 and 217 in January 2011
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THE " USHIO MARU "

CRUISE 215

CRUISE 216

CRUISE 217

IN JANUARY 2011

1. Cruise Itinerary

Cruise 215

Departure from Hakodate	Jan.	5,	2011
Hydrographic research (US11001 - US11008)		5	
Arrival at Usujiri		5	
Departure from Usujiri		5	
Return to Hakodate		5	
Total coverage 156.7 miles			

Cruise 216

Departure from Hakodate	Jan.	11,	2011
Arrival at Fukushima		11	
Departure from and arrival at Fukushima		12	
Departure from Fukushima		14	
Hydrographic research (US11009 - US11013)		14	
Start gill net sampling (for catching fur seal)		14	
Finish gill net sampling (for catching fur seal)		15	
Return to Hakodate		16	
Total coverage 272.9 miles			

Cruise 217

Departure from Hakodate	Jan.	21,	2011
Arrival at Usujiri		21	
Departure from Usujiri		22	
Start hydrographic research (US11014)		22	
Anchorage at Muroran		22	
Departure from Muroran		23	
Finish hydrographic research (US11027)		23	
Return to Hakodate		23	
Total coverage 215.5 miles			

2. Data on Temperature, Salinity and Computed Dynamic Depth Anomaly

Hydrographic work on deck and the data processing were made by the deck officers, crews, research staff and cadets of the “Ushio Maru”. Temperature and salinity were measured by CTD (Seabird SBE9Plus and SBE-19). Dynamic computations were made using a desk-top computer aboard the “Ushio Maru”.

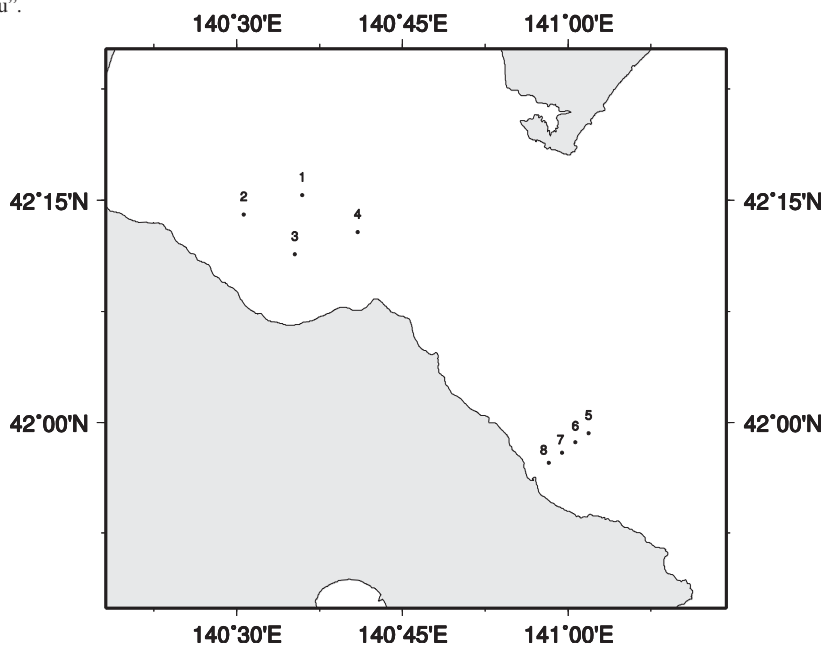


Figure 1. Oceanographic stations (Cruise 215)

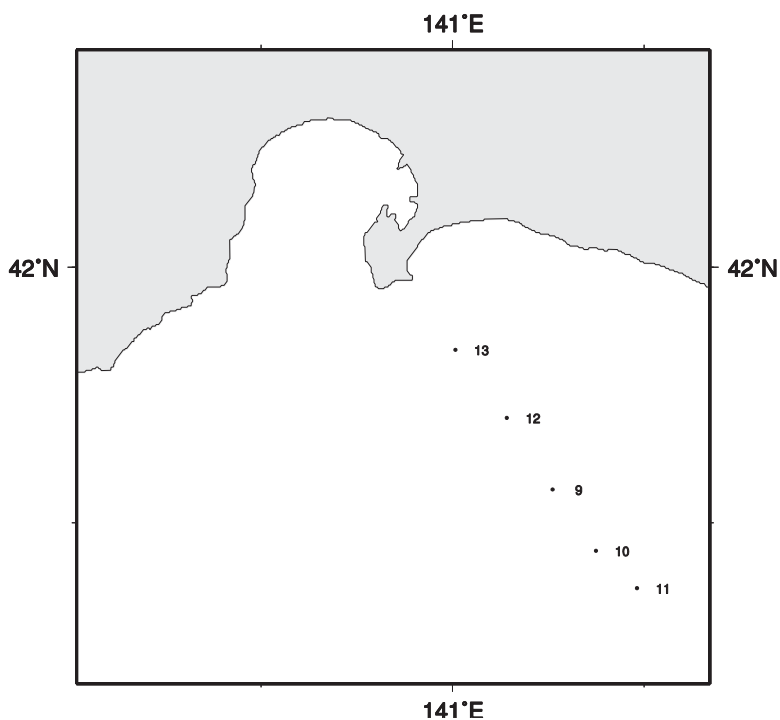


Figure 2. Oceanographic stations (Cruise 216)

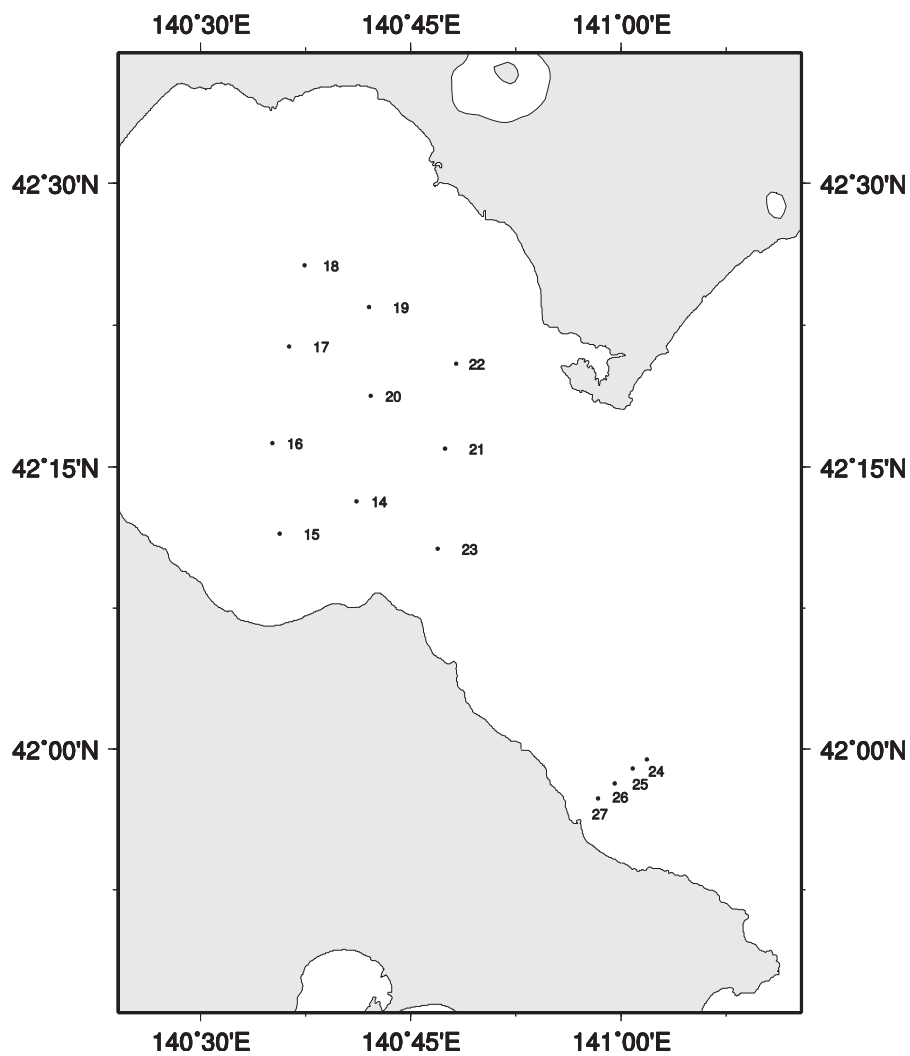


Figure 3. Oceanographic stations (Cruise 217)

Table 1: List of oceanographic stations

Cruise 215

Station	Lat. (N)*	Long. (E)*	Date	S.M.T	Depth	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar. (hPa)
US11001	42-15.4	140-35.9	1/5	1510-1514	93	West-3	West-1	West-5	0.3	6.3	c	1006.5
US11002	42-14.1	140-30.6	1/5	1610-1614	84	West-2	West-1	West-4	0.0	6.3	c	1006.2
US11003	42-11.4	140-35.2	1/5	1656-1700	82	SW -1	West-1	SW -2	0.1	6.4	c	1006.1
US11004	42-12.9	140-40.9	1/5	1729-1734	91	NW -1	WNW-1	NW -2	0.1	6.4	s	1005.6
US11005	41-59.3	141-01.8	1/5	1935-1939	101	NW -1	NW -1	NW -3	0.5	5.5	bc	1004.6
US11006	41-58.7	141-00.6	1/5	1947-1951	94	NW -2	NW -1	NW -4	0.7	5.5	bc	1004.5
US11007	41-58.0	140-59.4	1/5	1959-2008	87	NW -1	NW -1	NW -3	0.7	6.3	bc	1004.2
US11008	41-57.3	140-58.2	1/5	2011-2015	78	NW -1	NW -1	NW -3	0.3	6.3	bc	1004.1

Cruise 216

Station	Lat. (N)*	Long. (E)*	Date	S.M.T	Depth	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar. (hPa)
US11009	41-38.5	140-48.9	1/14	1025-1037	340	West-3	WSW-1	West-6	-3.2	10.2	bc	1018.7
US11010	41-36.7	140-50.6	1/14	1050-1054	84	NW -3	WSW-1	NW -6	-3.3	10.3	s	1018.7
US11011	41-35.6	140-52.2	1/14	1106-1109	54	NW -3	WSW-1	NW -5	-3.6	10.4	s	1018.7
US11012	41-40.6	140-47.1	1/14	1150-1200	236	WNW-3	WSW-1	WNW-6	-4.4	9.7	bc	1017.7
US11013	41-42.6	140-45.1	1/14	1218-1222	89	West-3	WSW-1	West-6	-4.1	9.4	bc	1017.1

Cruise 217

Station	Lat. (N)*	Long. (E)*	Date	S.M.T	Depth	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar. (hPa)
US11014	42-13.1	140-41.1	1/22	0826-0830	90	West-3	WNW-1	West-6	-1.8	4.3	bc	1012.5
US11015	42-11.4	140-35.6	1/22	0944-0948	83	WNW-3	WNW-1	WNW-5	-2.9	4.6	bc	1013.1
US11016	42-16.2	140-35.1	1/22	1108-1112	93	West-3	West-1	West-5	-2.2	4.6	bc	1013.2
US11017	42-21.3	140-36.3	1/22	1214-1218	90	West-3	West-1	West-5	-1.9	4.7	bc	1012.5
US11018	42-25.6	140-37.4	1/22	1300-1304	85	West-3	West-1	West-5	-0.7	4.5	s	1012.2
US11019	42-23.4	140-42.0	1/22	1340-1343	66	NW -3	West-1	NW -5	-1.5	4.3	bc	1012.2
US11020	42-18.7	140-42.1	1/22	1425-1429	71	West-3	West-1	West-5	-1.4	4.3	bc	1012.1
US11021	42-15.9	140-47.4	1/22	1511-1515	72	WNW-3	WNW-1	WNW-5	-1.4	4.0	c	1012.6
US11022	42-20.4	140-48.2	1/22	1554-1557	57	West-3	West-1	West-5	-1.1	4.1	bc	1012.6
US11023	42-10.6	140-46.9	1/23	0716-0720	95	WNW-3	WNW-1	WNW-5	-0.3	4.4	bc	1016.6
US11024	41-59.4	141-01.8	1/23	0917-0922	102	West-3	NW -1	West-5	-0.1	4.6	bc	1017.2
US11025	41-58.9	141-00.8	1/23	0929-0933	96	WNW-3	NW -1	WNW-5	0.2	4.7	bc	1017.5
US11026	41-58.1	140-59.5	1/23	0943-0947	88	WNW-3	NW -1	WNW-5	0.4	4.7	bc	1017.6
US11027	41-57.3	140-58.3	1/23	0954-0958	80	WNW-2	NW -1	WNW-4	0.5	4.7	bc	1017.6

(*): Fixed position by Global Positioning System

Table 2: Oceanographic data

STATION US11001				STATION US11002				STATION US11003			
LATITUDE 42-15.4 N				LATITUDE 42-14.1 N				LATITUDE 42-11.4 N			
LONGITUDE 140-35.9 E				LONGITUDE 140-30.6 E				LONGITUDE 140-35.2 E			
DEPTH (m) 93				DEPTH (m) 84				DEPTH (m) 82			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	6.657	33.553	26.325	5	6.564	33.571	26.351	5	6.756	33.586	26.337
10	6.656	33.555	26.326	10	6.564	33.570	26.351	10	6.758	33.585	26.336
20	6.665	33.551	26.323	20	6.570	33.570	26.350	20	6.759	33.584	26.336
30	6.664	33.555	26.325	30	6.571	33.571	26.350	30	6.760	33.583	26.335
40	6.664	33.556	26.326	40	6.573	33.570	26.349	40	6.761	33.583	26.335
50	6.663	33.556	26.326	50	6.570	33.569	26.349	50	6.757	33.583	26.335
75	6.617	33.557	26.333	75	6.484	33.552	26.347	75	6.721	33.579	26.337

STATION US11004				STATION US11005				STATION US11006			
LATITUDE 42-12.9 N				LATITUDE 41-59.3 N				LATITUDE 41-58.7 N			
LONGITUDE 140-40.9 E				LONGITUDE 141-01.8 E				LONGITUDE 141-00.6 E			
DEPTH (m) 91				DEPTH (m) 101				DEPTH (m) 94			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	6.685	33.576	26.340	5	5.878	33.234	26.173	5	5.972	33.284	26.200
10	6.686	33.576	26.339	10	5.879	33.233	26.171	10	6.000	33.283	26.196
20	6.686	33.577	26.340	20	5.878	33.232	26.170	20	6.407	33.414	26.248
30	6.686	33.577	26.340	30	5.884	33.233	26.171	30	6.674	33.443	26.236
40	6.691	33.578	26.340	40	5.889	33.234	26.171	40	6.690	33.445	26.236
50	6.679	33.574	26.339	50	5.886	33.235	26.172	50	6.816	33.469	26.238
75	6.642	33.570	26.340	75	6.542	33.409	26.227	75	6.834	33.474	26.239
				100	6.914	33.552	26.290				

STATION US11007			
LATITUDE 41-58.0 N			
LONGITUDE 140-59.4 E			
DEPTH (m) 87			
Press.	Temp.	Salinity	Sigma-T
5	6.717	33.454	26.239
10	6.719	33.454	26.239
20	6.729	33.453	26.237
30	6.729	33.455	26.238
40	6.734	33.455	26.237
50	6.739	33.456	26.238
75	6.793	33.470	26.241

STATION US11008			
LATITUDE 41-57.3 N			
LONGITUDE 140-58.2 E			
DEPTH (m) 78			
Press.	Temp.	Salinity	Sigma-T
5	6.609	33.427	26.232
10	6.601	33.426	26.233
20	6.614	33.426	26.231
30	6.626	33.427	26.230
40	6.655	33.433	26.230
50	6.751	33.456	26.236
75	6.868	33.553	26.297

STATION US11009			
LATITUDE 41-38.5 N			
LONGITUDE 140-48.9 E			
DEPTH (m) 340			
Press.	Temp.	Salinity	Sigma-T
5	10.574	33.787	25.906
10	10.588	33.789	25.905
20	10.585	33.796	25.911
30	10.592	33.804	25.917
40	10.584	33.815	25.926
50	10.339	33.804	25.960
75	9.965	33.835	26.049
100	9.714	33.879	26.125
125	9.058	33.921	26.264
150	8.998	33.925	26.277
175	8.923	33.932	26.294
200	8.805	33.940	26.319
250	8.695	33.950	26.344
300	8.637	33.957	26.358

STATION US11010			
LATITUDE 41-36.7 N			
LONGITUDE 140-50.6 E			
DEPTH (m) 84			
Press.	Temp.	Salinity	Sigma-T
5	10.682	33.789	25.889
10	10.688	33.788	25.887
20	10.694	33.792	25.889
30	10.696	33.793	25.890
40	10.724	33.810	25.898
50	10.683	33.833	25.923
75	10.422	33.855	25.985

STATION US11011			
LATITUDE 41-35.6 N			
LONGITUDE 140-52.2 E			
DEPTH (m) 54			
Press.	Temp.	Salinity	Sigma-T
5	10.682	33.745	25.855
10	10.685	33.746	25.855
20	10.694	33.748	25.855
30	10.696	33.747	25.854
40	10.706	33.747	25.852
50	10.702	33.747	25.853

STATION US11012			
LATITUDE 41-40.6 N			
LONGITUDE 140-47.1 E			
DEPTH (m) 236			
Press.	Temp.	Salinity	Sigma-T
5	10.099	33.752	25.960
10	10.109	33.837	26.025
20	10.110	33.837	26.025
30	10.106	33.838	26.027
40	10.120	33.838	26.025
50	10.115	33.840	26.026
75	10.077	33.882	26.066
100	9.816	33.887	26.114
125	9.598	33.906	26.165
150	9.392	33.914	26.205
175	9.086	33.937	26.272
200	8.580	33.955	26.365

STATION US11013			
LATITUDE 41-42.6 N			
LONGITUDE 140-45.1 E			
DEPTH (m) 89			
Press.	Temp.	Salinity	Sigma-T
5	9.708	33.823	26.082
10	9.719	33.825	26.081
20	9.726	33.825	26.081
30	9.722	33.823	26.080
40	9.723	33.824	26.080
50	9.721	33.829	26.084
75	9.592	33.853	26.124

STATION US11014			
LATITUDE 42-13.1 N			
LONGITUDE 140-41.1 E			
DEPTH (m) 90			
Press.	Temp.	Salinity	Sigma-T
5	4.781	33.526	26.531
10	4.782	33.523	26.529
20	4.779	33.521	26.527
30	4.783	33.521	26.527
40	4.785	33.522	26.528
50	4.786	33.523	26.528
75	4.793	33.527	26.531

STATION US11015			
LATITUDE 42-11.4 N			
LONGITUDE 140-35.6 E			
DEPTH (m) 83			
Press.	Temp.	Salinity	Sigma-T
5	4.857	33.538	26.532
10	4.860	33.564	26.553
20	4.856	33.560	26.550
30	4.857	33.558	26.548
40	4.857	33.557	26.547
50	4.846	33.558	26.549
75	4.737	33.548	26.554

STATION US11016			
LATITUDE 42-16.2 N			
LONGITUDE 140-35.1 E			
DEPTH (m) 93			
Press.	Temp.	Salinity	Sigma-T
5	4.932	33.567	26.547
10	4.935	33.567	26.547
20	4.936	33.565	26.545
30	4.933	33.565	26.545
40	4.935	33.563	26.543
50	4.935	33.564	26.544
75	4.935	33.563	26.544

STATION US11017			
LATITUDE 42-21.3 N			
LONGITUDE 140-36.3 E			
DEPTH (m) 90			
Press.	Temp.	Salinity	Sigma-T
5	4.960	33.545	26.527
10	4.962	33.566	26.543
20	4.967	33.566	26.542
30	4.969	33.565	26.541
40	4.970	33.565	26.541
50	4.967	33.565	26.541
75	4.968	33.564	26.541

STATION US11018			
LATITUDE 42-25.6 N			
LONGITUDE 140-37.4 E			
DEPTH (m) 85			
Press.	Temp.	Salinity	Sigma-T
5	4.905	33.533	26.523
10	4.908	33.564	26.547
20	4.911	33.567	26.550
30	4.907	33.566	26.549
40	4.905	33.564	26.547
50	4.903	33.564	26.547
75	4.903	33.562	26.546

STATION US11019			
LATITUDE 42-23.4 N			
LONGITUDE 140-42.0 E			
DEPTH (m) 66			
Press.	Temp.	Salinity	Sigma-T
5	4.739	33.446	26.472
10	4.739	33.503	26.517
20	4.740	33.502	26.517
30	4.724	33.501	26.517
40	4.702	33.499	26.518
50	4.662	33.499	26.522

STATION US11020			
LATITUDE 42-18.7 N			
LONGITUDE 140-42.1 E			
DEPTH (m) 71			
Press.	Temp.	Salinity	Sigma-T
5	4.602	33.510	26.538
10	4.573	33.506	26.538
20	4.607	33.514	26.541
30	4.704	33.542	26.552
40	4.749	33.542	26.547
50	4.749	33.543	26.548

STATION US11021			
LATITUDE 42-15.9 N			
LONGITUDE 140-47.4 E			
DEPTH (m) 72			
Press.	Temp.	Salinity	Sigma-T
5	4.411	33.396	26.468
10	4.411	33.395	26.467
20	4.414	33.394	26.466
30	4.416	33.392	26.465
40	4.419	33.393	26.465
50	4.426	33.395	26.465

STATION US11022			
LATITUDE 42-20.4 N			
LONGITUDE 140-48.2 E			
DEPTH (m) 57			
Press.	Temp.	Salinity	Sigma-T
5	4.495	33.312	26.392
10	4.494	33.315	26.395
20	4.498	33.323	26.401
30	4.667	33.461	26.492
40	4.887	33.529	26.522
50	4.919	33.528	26.518

STATION US11023			
LATITUDE 42-10.6 N			
LONGITUDE 140-46.9 E			
DEPTH (m) 95			
Press.	Temp.	Salinity	Sigma-T
5	4.698	33.335	26.388
10	4.705	33.334	26.388
20	4.702	33.326	26.381
30	4.717	33.320	26.375
40	4.707	33.319	26.375
50	4.541	33.310	26.386
75	4.828	33.511	26.514

STATION US11024			
LATITUDE 41-59.4 N			
LONGITUDE 141-01.8 E			
DEPTH (m) 102			
Press.	Temp.	Salinity	Sigma-T
5	5.050	33.299	26.321
10	5.047	33.299	26.321
20	5.048	33.299	26.322
30	5.043	33.298	26.321
40	5.026	33.296	26.322
50	5.010	33.297	26.324
75	4.840	33.303	26.348
100	4.762	33.399	26.432

STATION US11025			
LATITUDE 41-58.9 N			
LONGITUDE 141-00.8 E			
DEPTH (m) 96			
Press.	Temp.	Salinity	Sigma-T
5	5.100	33.298	26.315
10	5.100	33.297	26.314
20	5.102	33.297	26.314
30	5.095	33.297	26.314
40	5.088	33.295	26.313
50	5.068	33.292	26.313
75	4.824	33.299	26.346

STATION US11026			
LATITUDE 41-58.1 N			
LONGITUDE 140-59.5 E			
DEPTH (m) 88			
Press.	Temp.	Salinity	Sigma-T
5	5.115	33.274	26.294
10	5.116	33.291	26.307
20	5.117	33.299	26.313
30	5.112	33.298	26.313
40	5.113	33.300	26.315
50	5.057	33.292	26.315
75	4.774	33.332	26.378

STATION US11027			
LATITUDE 41-57.3 N			
LONGITUDE 140-58.3 E			
DEPTH (m) 80			
Press.	Temp.	Salinity	Sigma-T
5	4.973	33.295	26.327
10	4.971	33.293	26.325
20	4.960	33.291	26.325
30	4.958	33.291	26.325
40	4.951	33.291	26.326
50	4.926	33.305	26.340
75	4.764	33.325	26.373

